AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions and listings of claims in the application.

1. - 34. Cancelled

35. (New) A method of forming a silica film coated on a substrate including the steps of:

producing a silica precursor formulation having a water content of no more than 5% by volume by adding silicic acid tetramethyl ester homopolymer to a solvent;

coating a substrate with the silica precursor formulation; and

curing the silica precursor formulation onto the substrate in a vaporous ammoniacal environment.

36. (New) The method of claim 35 wherein the solvent is alcohol or an alcohol-aqueous solution.

37. (New) The method of claim 35 wherein the silica precursor formulation contains an amount of tetramethoxysilane.

38. (New) The method of claim 35 wherein the silica precursor formulation is formed by adding methyl-silicate-51 (MS-51), comprising >94% silicic acid tetramethyl ester homopolymer by volume, <3% tetramethoxysilane by volume and <3% methanol by volume, to the solvent.

39. (New) The method of claim 38 wherein the silica precursor formulation comprises about 0.2-100 parts alcohol by volume and 0.01-1 parts water by volume for each part of MS-51.

40. (New) The method of claim 39 wherein the silica precursor formulation comprises about 0.2-5 parts alcohol by volume and 0.01-0.1 parts water by volume for each part of MS-51.

41. (New) The method of claim 40 wherein the ratio of reagents in the silica precursor formulation is 1.0 part MS-51: 0.1 parts water: 10.0 parts alcohol by volume.

42. (New) The method of claim 35 wherein the coating is performed by spin coating or dipping.

43. (New) The method of claim 35 wherein the coating further includes allowing the coating to settle before curing.

44. (New) The method of claim 35 wherein the curing is carried out by placing the coated substrate in a closed ammoniacal environment.

45. (New) The method of claim 44 wherein the ammoniacal environment contains water, ammonia and alcohol.

46. (New) The method of claim 45 wherein the solvent used in the formation of the silica precursor is an alcohol, and the alcohol contained in the ammoniacal environment is the same alcohol as used in the formation of the silica precursor.

47. (New) The method of claim 1 further including controlling the solvent content to control characteristics of the silica film.

48. (New) The method of claim 45 further including controlling the alcohol content in the ammoniacal environment to control characteristics of the silica film.

49. (New) The method of claim 35 further including controlling a pore size of the silica film by controlling the solvent content and type in the silica precursor formulation.

50. (New) The method of claim 35 further including controlling a pore density of the silica film by controlling the solvent content and type in the ammoniacal environment.

51. (New) The method of claim 46 further including controlling a porosity of the silica film by controlling the solvent content and type in the precursor formulation and alcohol content and type in the ammoniacal environment.

52. (New) A silica film having a refractive index between 1.1 and 1.56 and a film thickness less than 100 microns formed by a method including the steps of:

producing a silica precursor formulation having a water content of no more than 5% by volume by adding silicic acid tetramethyl ester homopolymer to a solvent;

coating a substrate with the silica precursor formulation; and

curing the silica precursor formulation onto the substrate in a vaporous ammoniacal environment.

53. (New) The silica film of claim 52 having a thickness of less than 1μm.

54. (New) The silica film of claim 52 comprising a continuous, interconnected, nano-porous silica network.

55. (New) The silica film of claim 52 comprising a hardness greater than 7H on pencil scale.

56. (New) The silica film of claim 52 wherein the film is resistant to washing with water, alcohols, common acids and alkalis.

57. (New) The silica film of claim 52 wherein the film is anti-fogging.

58. (New) An anti-reflection coating for a transparent substrate comprised by a silica film formed according to the method of claim 35.

59. (New) An anti-fogging coating for a transparent substrate comprised by a silica film formed according to the method of claim 35.

60. (New) An anti-scratch coating for a substrate comprised by a silica film formed according to the method of claim 35.

61. (New) An anti-static coating for a substrate comprised by a silica film formed according to the method of claim 35.

62. (New) A method of forming a silica film coated on a substrate including the steps of:

producing a silica precursor formulation having a water content of no more than 5% by volume by adding silicic acid tetramethyl ester homopolymer to a solvent;

coating a substrate with the silica precursor formulation;

placing a coated substrate in a closed solvent environment;

establishing equilibrium between the solvent in the precursor formulation and the solvent environment; and

curing the silica precursor formulation onto the substrate in an ammoniacal environment containing solvent by introducing ammonia vapour and water vapour to the closed solvent environment.

63. (New) The method of claim 36 wherein the silica precursor formulation is formed by adding methyl-silicate-51 (MS-51), comprising >94% silicic acid tetramethyl ester homopolymer by volume, <3% tetramethoxysilane by volume and <3% methanol by volume, to the solvent.